

the design: find map

"new ECC stuff"

844691

SETTLEMENT REMEDIAL ACTION PLAN
PREPARED IN RESPONSE TO THE
SEPTEMBER 1987 RECORD OF DECISION
FOR THE
ENVIRONMENTAL CONSERVATION
AND
CHEMICAL CORPORATION (ECC) SITE
ZIONSVILLE, INDIANA

MARCH 23, 1988

PREPARED FOR:

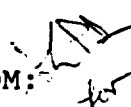
ECC SETTLERS STEERING COMMITTEE

PREPARED BY:
ENVIRONMENTAL RESOURCES MANAGEMENT - NORTH CENTRAL, INC.
102 WILMOT ROAD, SUITE 300
DEERFIELD, ILLINOIS 60015

ERM-North Central, Inc.

MEMORANDUM

TO: Elizabeth Maxwell, USEPA
Karen Vendl, USEPA

FROM:  Roy O. Ball, ERM-North Central, Inc.

DATE: March 23, 1988

SUBJECT: ECC Site, Zionsville, IN

ERM-North Central, at the direction of Jerome Amber and Donald Smith of the ECC Settlers Technical Committee, has enclosed for your prior review in preparation for the meeting March 25, 1988, one (1) copy of each of the following documents:

1. "Settlement Remedial Action Plan Prepared in Response to the September 1987 Record of Decision for the Environmental Conservation and Chemical Corporation (ECC) Site, Zionsville, Indiana".
2. "Conceptual Work Plan for Field Investigation of Finley Creek Contamination Site".

SETTLEMENT REMEDIAL ACTION PLAN
PREPARED IN RESPONSE TO THE
SEPTEMBER 1987 RECORD OF DECISION
FOR THE
ENVIRONMENTAL CONSERVATION AND CHEMICAL CORPORATION (ECC)
SITE
ZIONSVILLE, INDIANA

BACKGROUND

To facilitate settlement and without waiver of any rights, Environmental Resources Management - North Central, Inc. (ERM) was retained by the ECC Settlers Steering Committee to prepare a Remedial Action Plan for the ECC site which meets the requirements of the plan described by the EPA in the September 1987 Record of Decision (ROD). The alternative remedial action plan presented herein (the Settlement Plan) addresses each of the environmental concerns associated with the ECC site, is cost effective, remediates observed contamination at the ECC Site in a complete and timely fashion, and most closely complies with SARA requirements since it involves on-site destruction of contamination.

EPA'S REMEDIAL ACTION PLAN (THE EPA PLAN)

The major components of the EPA Plan include:

- o Access control and monitoring,
- o A RCRA Performance Cap,
- o Ground water interception and collection,

- o Ground water treatment with an on-site facility.

The components of the EPA Plan are intended to address the contaminated soil at the ECC Site as well as contaminated ground water in the saturated till beneath the site. The ECC site presently has a surface runoff discharge point at the southern end of the property, which is an overflow from a sump installed by EPA as part of its emergency response actions at the ECC site.

ECC SETTLERS' REMEDIAL ACTION PLAN (THE SETTLEMENT PLAN)

The major components of the Settlement Plan include:

- o Access restrictions
- o Ground water and surface water monitoring
- o Diversion of surface water runoff upgradient of concrete pad
- o Collection of contaminated surface water from beneath the concrete pad
- o Shallow, saturated zone ground water interception and collection
- o Soil vapor extraction and incineration as needed (using catalytic incineration) to destroy contamination
- o Soil cover

The primary, active remediation component of the Settlement Plan is soil vapor extraction and destruction. The ECC Settlers Steering Committee has solicited opinions from consultants,

notably Terra Vac, regarding the suitability of vapor extraction for the ECC site. Terra Vac, a recognized leader in soil vapor extraction and contractor chosen by the USEPA for vapor extraction remediation, has determined based on RI data, that vapor extraction is a viable and effective alternative for the ECC site. Terra Vac has estimated that one year of operation will be sufficient to remove and destroy virtually all of the contaminants. (A passive vapor extraction system will also enhance removal of residual contamination below the vadose zone).

The ECC Settlers Steering Committee is confident that the settlement response measures listed above will fully address all necessary remedial actions for the ECC site. This proposed plan incorporates, elaborates and expands on the conceptual remedies proposed previously by the ECC Settlers Steering Committee (letter to Ms. Karen Vendl of USEPA from ERM-North Central dated May 29, 1987) and responds to the concerns raised by Mr. Basil Constantelos in his letter of February 10, 1988 to the ECC Technical Committee. Furthermore, the Settlement Plan is the plan that best meets SARA objectives.

This proposed remedial action plan covers remedial action at the ECC site only. It is fully compatible with the Northside Landfill (NSL) Steering Committee's Proposed Alternative Remedy presented to the EPA on February 12, 1988, which we support. The ECC site is physically and chemically distinct from the NSL site and the new source of contamination (the Finley Creek Source) that was discovered and initially investigated by ERM for the ECC Settlers Steering Committee. Although chlorinated solvents were detected at the Finley Creek Source, a careful review of aerial photographs and analysis of the chemical and hydrological data indicate that the area is physically distinct from the ECC site, that the contamination does not appear to result from the transport of contaminants from the ECC site, and that this contamination is a separate source from the ECC and NSL sites.

DESCRIPTION OF THE SETTLEMENT PLAN

Conceptually, the Settlement Plan consists of 7 components as previously listed. Detailed descriptions of each component are described below and presented on the site plan shown in Figure 1.

1) Access Restrictions

Deed restrictions would be placed on the ECC site. The restrictions should prevent future development of the land to protect against direct contact with contaminants or further migration that could result from site excavation and development. The deed restrictions should also prohibit the use of ground water or installation of wells on-site in both the saturated till and the underlying sand and gravel. Access to the ECC Site would be controlled by fencing around the site perimeter and the posting of signs.

2) Ground Water and Surface Water Monitoring Program

The effectiveness of the Settlement Plan will be assessed through a ground water and surface water monitoring program. Ground water would be monitored at a single monitoring well nest located just downgradient of the southern limit of the ECC property (Figure 1). One well would be installed in the sand and gravel aquifer and one well in the saturated portion of the overlying glacial till. The two wells would be sampled quarterly the first year and analyzed for the parameters on the Target Compound List (TCL). The sampling frequency and analysis parameters for subsequent sampling will be determined after review of the first year data. Surface water would be sampled at the same frequency at the single sampling location shown on Figure 1 and analyzed for the same parameters as the monitoring wells.

3) Diversion of Surface Water Runoff Upgradient of Concrete Pad

Because an interim soil cap has been placed over the site, the only known source of contaminants to surface runoff is the subgrade material beneath the concrete pad on the southern end of the ECC site. According to the RI for the ECC site, surface water runoff from the northern part of the site largely flows south where a berm along the north edge of the concrete pad redirects runoff to a drainage ditch west of the site. This berm will be repaired and/or reinforced to ensure that runoff is diverted and is not able to infiltrate beneath the pad. This will essentially eliminate the generation of contaminated runoff into the EPA-installed sump located at the south end of the pad.

4) Collection of Contaminated Surface Water Beneath the Concrete Pad

As previously noted, surface water which infiltrates the concrete pad may become contaminated. A lined collection trench approximately 4 feet deep by 1 foot in width will be installed along the south and southeast portions of the concrete pad to collect potentially contaminated surface water (Figures 1 and 2). The trench will drain to a holding tank. Any water collected will be analyzed to determine the suitability for direct discharge. If necessary, the collected water will be conveyed to the nearest Indianapolis sewerage connection. Once the surface water diversion system described in 3, above, is installed, the amount of water flowing into this trench will be negligible.

5) Ground Water Interception

The ground water interception system will consist of a single french drain extending east-west along the southern border of the ECC site (Figure 1). The drain will be 230 feet in length, 4 feet in width and will extend an average of 16 feet beneath the

surface (Figure 3). The purpose of the drain is to prevent contaminated ground water, if any, within the glacial till from moving offsite towards Finley Creek. Using the hydrogeologic assumptions from the ECC Feasibility Study for the design of the french drain system, approximately 0.5 to 1.5 gallons per minute would flow to the drain. Ground water discharge would be pumped into the NSL pipe connection to the Indianapolis sewerage system.

6) Soil Vapor Extraction and Destruction Using Catalytic Incineration

Vapor extraction will be used to volatilize the soil contaminants in situ. Due to the negative pressure gradient the system will generate in the soils, hydrocarbon vapors will migrate to the extraction system. A schematic cross section of a vapor extraction trench is illustrated on Figure 4. The hydrocarbon vapors will be collected and then destroyed as needed by catalytic incineration prior to release.¹

Prior to system startup, pilot testing will be implemented to measure the radius of influence of vacuum extraction wells and to determine the optimum spacing of extraction points/trenches. In addition, the rate of hydrocarbon extraction will be quantified by determining the optimal vacuum level for extraction. The proposed pilot test plan, as provided by Terra Vac, is included as Attachment 1.

¹. Residual contamination after an estimated one year of vapor extraction is expected to be less than 1% of the initial soil contamination, and will be remediated by installation of a passive venting system comprised of well points/trenches open to the unsaturated portion of the glacial till. At the surface, the individual risers will be equipped with wind vane turbines to enhance the passive removal of residual contamination.

7) Soil Cover

A soil cover, using the highly impermeable native till, will be installed over the ECC site to prevent erosion and water ponding on-site. Prior to placing the till, the site would be graded to fill existing depressions, eliminate sharp grade changes and provide for site drainage. Vegetative cover will also be established to mitigate potential effects of erosion.

SCHEDULE AND COST

The estimated time required to complete pilot testing, and the design and implementation phases of the Settlement Plan is illustrated, by component, on Figure 5. This schedule is based on the number of weeks from a notice to proceed.

Estimated costs to implement the Settlement Plan are shown on Table 1.

TABLE 1

PRELIMINARY COST ESTIMATES, SETTLEMENT
REMEDIAL ACTION PLAN, ECC SITE

<u>Direct Capital Components</u>	<u>Quantity</u>	<u>Unit</u>	<u>Total</u>
1. Access Restrictions			
- fencing	2,100 LF.	\$ 12/LF	\$ 25,200
- misc. (Gates, Signs)	---	---	<u>2,500</u>
			27,700
2. Ground Water and Surface Water Monitoring			
- wells	2 EA.	5,000/EA.	10,000
- misc. (Sampling Equipment)	---	---	<u>1,000</u>
			11,000
3. Diversion of Surface Water Runoff Upgradient of Concrete Pad			
- misc. (Berm regrading/ buildup etc.)	---	---	10,000
4. Collection of Residual Leachate Beneath the Concrete Pad			
- excavate trench	110 CY	8/CY	880
- line trench (geotextile)	4,000 SF	0.17	680
- perforated pipe	365 LF	6/LF	2,190
- gravel backfill	100 CY	15/CY	1,500
- sump station	1 EA.	2,000/EA.	2,000
- holding tank	1 EA.	2,000/EA.	<u>2,000</u>
			9,250
5. Soil Cap			
- clay layer excavation and placement	---	---	185,000

6. Soil Vapor Extraction
and Treatment

- pilot test	1 EA.	100,000	100,000
- system design and installation	1 EA.	150,000	150,000
- catalytic oxidizer with HCl scrubber, if necessary	1 EA.	250,000	<u>250,000</u>
			500,000

7. Passive Venting

- wind vane turbines	50 EA.	50/EA.	2,500
----------------------	--------	--------	-------

8. Ground Water Interception

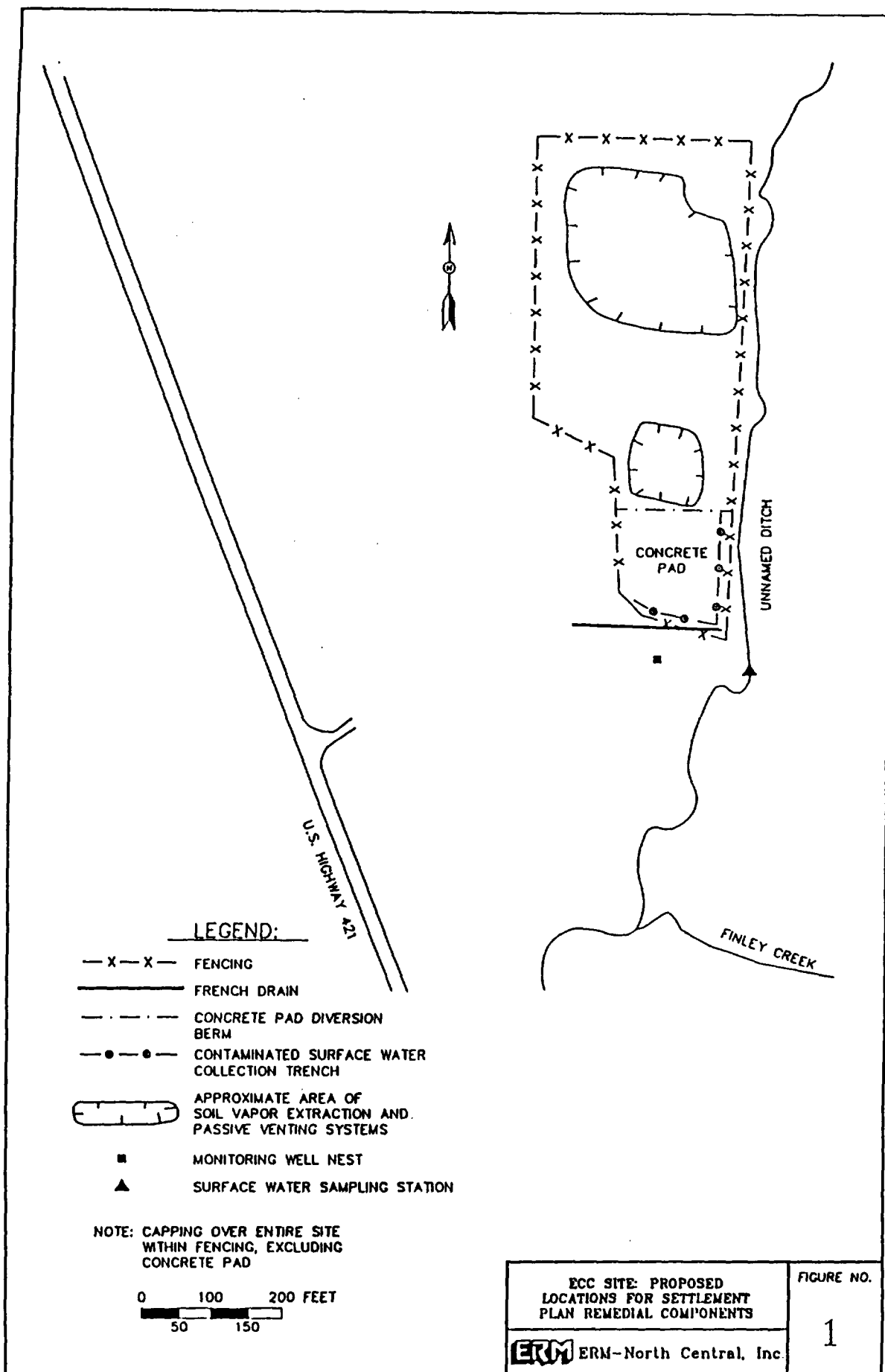
- excavate trench	500 CY	10/CY	5,000
- liner, piping, etc.	---	---	4,000
- gravel backfill	500 CY	15/CY	7,500
- wet well, sump pump	---	---	5,000
- holding tank	1 EA.	10,000/EA	<u>10,000</u>
			31,500

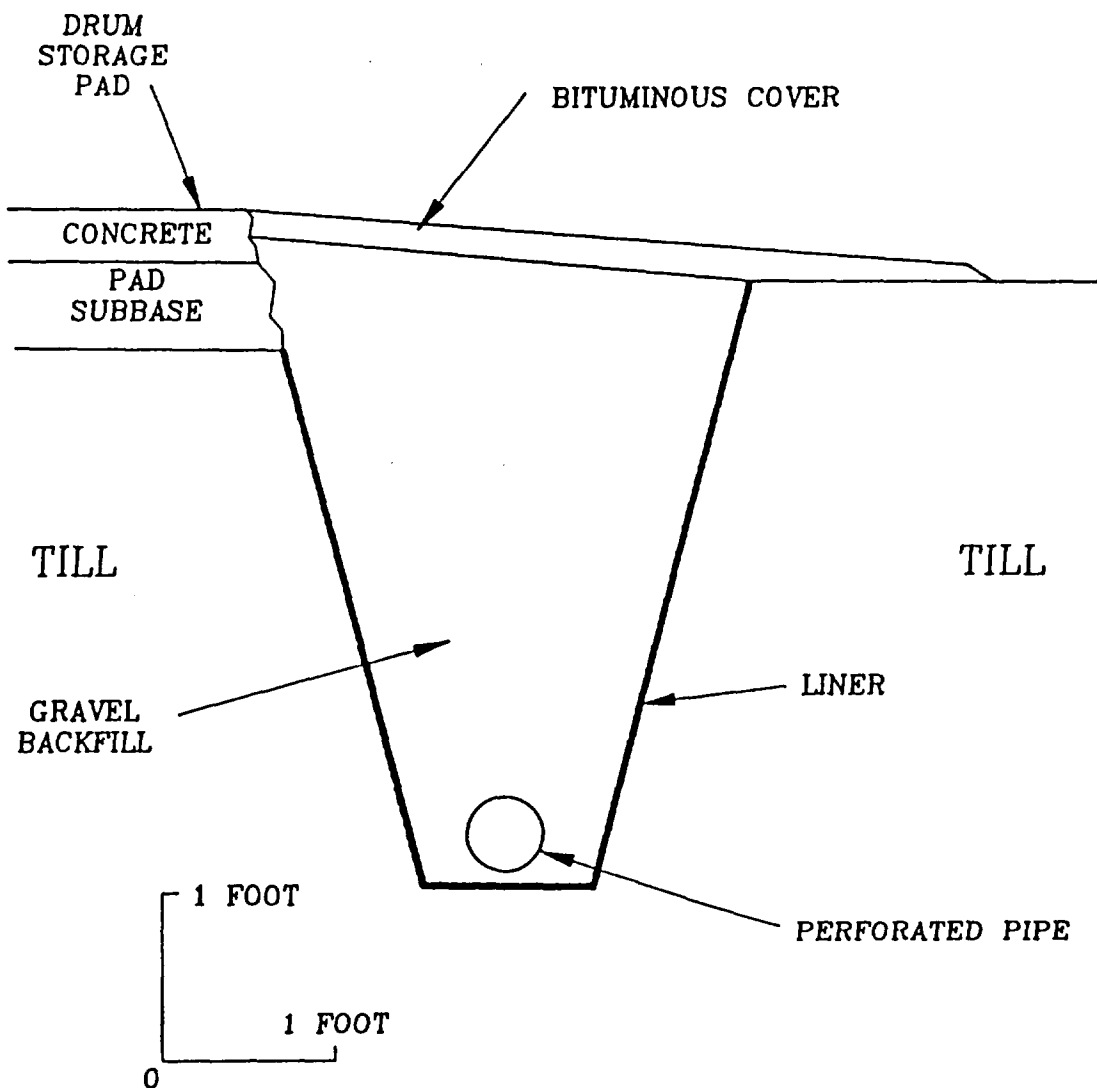
Sub-Total: Direct Capital Costs	776,950
20% Contingency	155,390
10% Engineering	<u>77,695</u>

Total Capital Costs \$1,010,035

<u>Operations and Maintenance Components</u>	<u>Cost for Year 1</u>	<u>Annual Costs</u>
		<u>Year 2</u>
1. Access Restrictions	\$ 5,000	\$ 5,000
2. Ground Water and Surface Water Monitoring System	20,000	20,000
3. Diversion of Surface Water Runoff Beneath Concrete Pad	2,000	2,000
4. Collection of Residual Leachate Beneath Concrete Pad	4,000	4,000
5. Soil Cap	10,000	10,000
6. Soil Vapor Extraction and Treatment	400,000*	---
7. Passive Venting	2,000	2,000
8. Ground Water Interception	<u>7,500</u>	<u>7,500</u>
	\$ 450,500*	\$ 50,500

* Anticipated operation of 1 year for vapor extraction system.



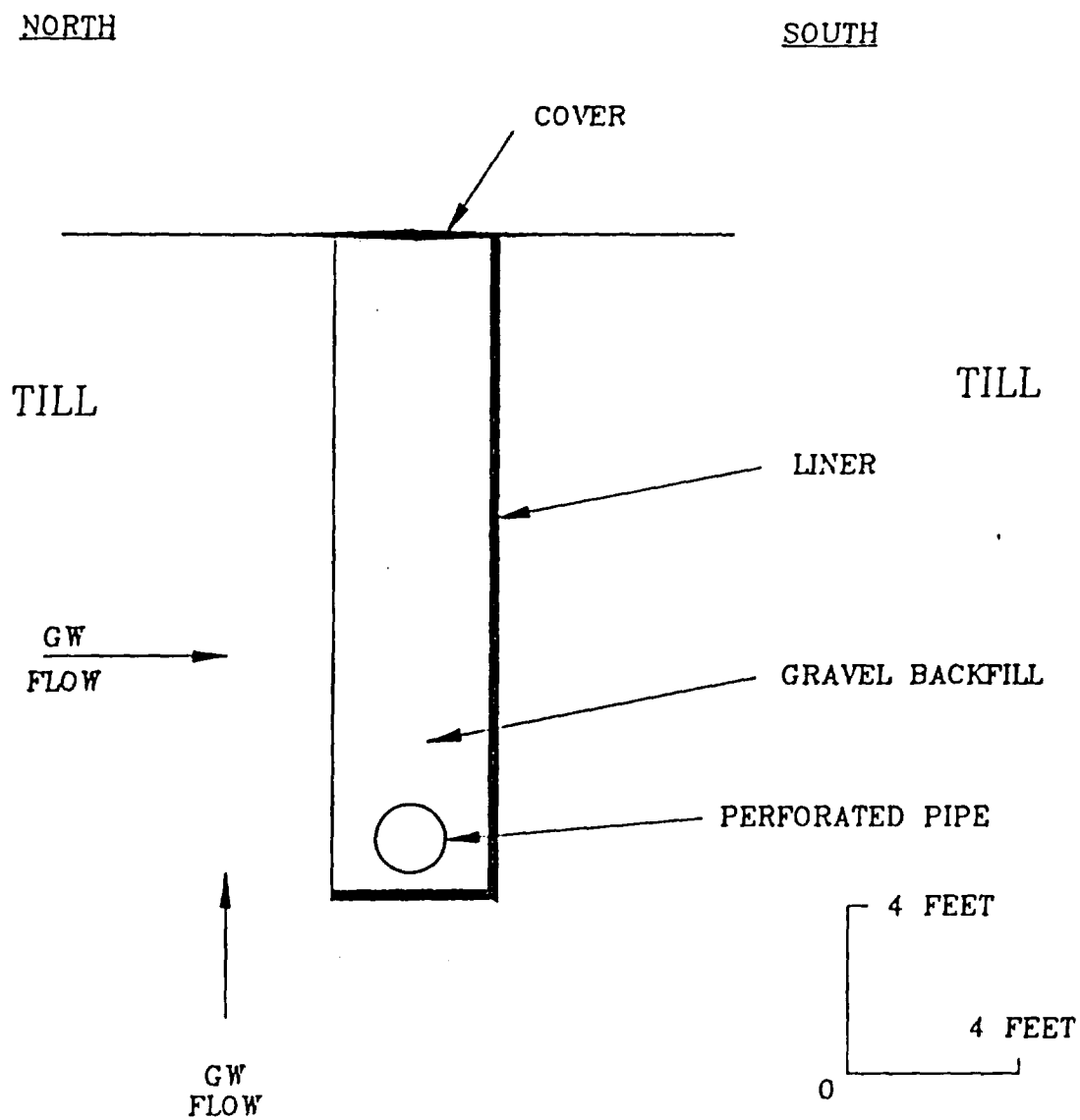


SCHEMATIC CROSS-SECTION
CONTAMINATED SURFACE
WATER COLLECTION TRENCH

ERM ERM-North Central, Inc.

FIGURE

2



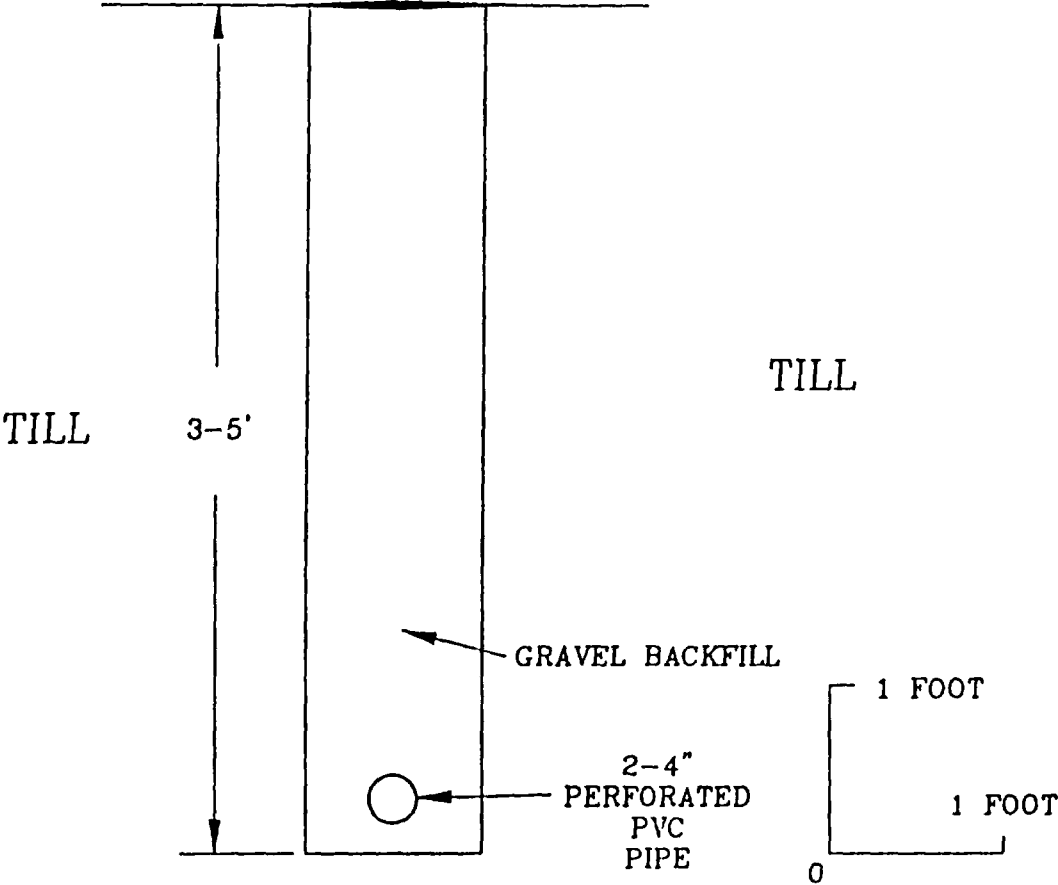
SCHEMATIC CROSS SECTION
PROPOSED FRENCH DRAIN

ERM ERM-North Central, Inc.

FIGURE

3

RISERS TO SURFACE
AT 200' INTERVALS



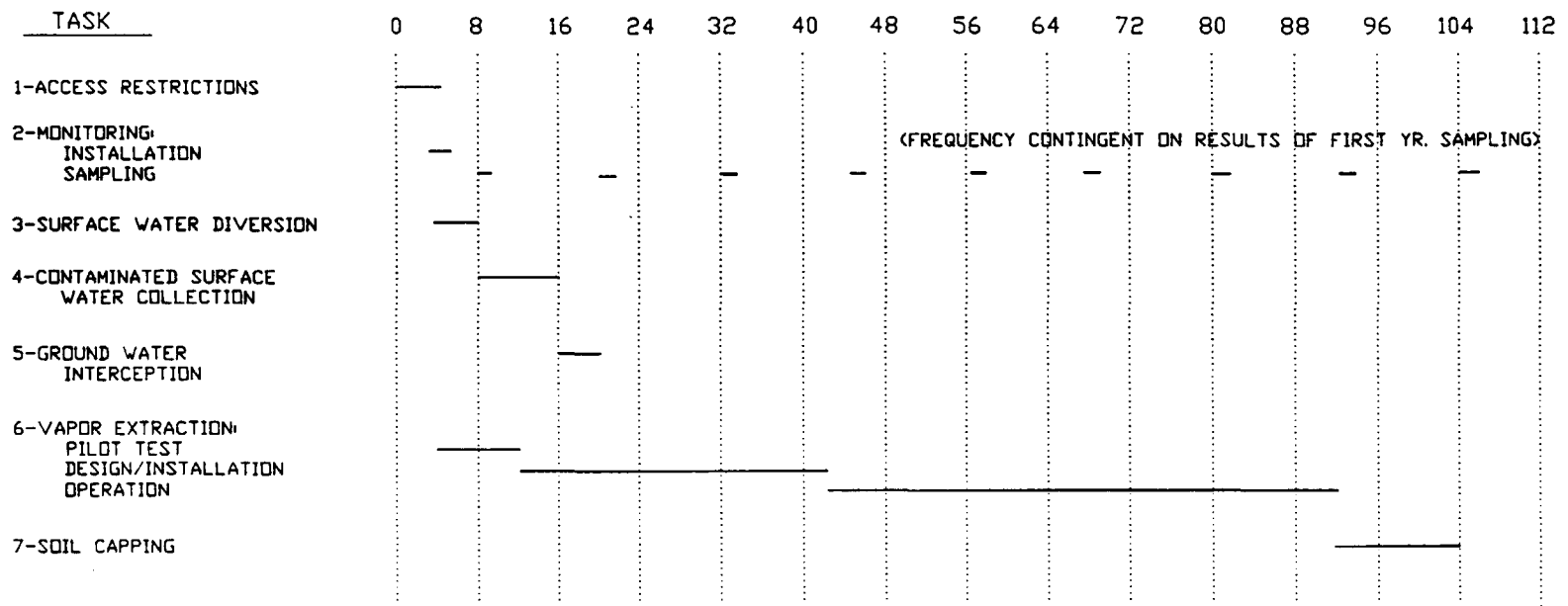
SCHEMATIC CROSS-SECTION
VAPOR EXTRACTION
SYSTEM TRENCH

ERM ERM-North Central, Inc.

FIGURE

4

ESTIMATED PROJECT SCHEDULE
 INSTALLATION OF
 ECC SETTLEMENT REMEDIAL ACTION PLAN
 WEEKS FROM EFFECTIVE DATE OF PLAN APPROVAL



ECC SITE
 ESTIMATED PROJECT SCHEDULE
 ECC SETTLEMENT PLAN INSTALLATION

ERM ERM-North Central, Inc.

FIGURE NO.

5

ATTACHMENT A

TERRA VACSTATEMENT OF QUALIFICATIONSINTRODUCTION

Terra Vac has developed and holds two patents on a vacuum extraction process for the in-situ removal of volatile organics from soils. The Terra Vac Process utilizes vacuum technology to volatilize and extract contaminants, such as gasoline and chlorinated solvents, directly from subsoils. Terra Vac has specialized in vacuum extraction, and is the leader in implementing this technology.

In the four years since Terra Vac was created, we have applied our technology at over forty sites, including gasoline service stations, Superfund sites, and industrial sites. Our clean-up experience covers nearly every hydrogeologic setting as well as a wide range of contaminants. This experience is detailed in our current Project List, which is attached.

DESCRIPTION OF THE TECHNOLOGY

Contaminated soils at a potential clean-up site are first characterized and delineated. After site assessment, subsurface equipment is installed quickly and safely. Terra Vac Vacuum Extraction and recovery equipment is then mobilized to the site and subsurface extraction begins.

The Terra Vac treatment process works by volatilizing the soil contaminants in-situ. A subsurface vacuum propagates from an extraction well to volatilize the hydrocarbons. Due to the negative pressure gradient generated in the soils, hydrocarbon vapors and liquids migrate to the extraction well. From the well, the hydrocarbon vapors are brought to the surface where they can be collected and treated. The radius of influence of a single extraction well ranges from tens of feet to hundreds of feet.

The Terra Vac Process is not limited by depth. Our process has been implemented for recovery at depths up to 300 feet and as shallow as 4 feet. Recovery rates in excess of 2000 pounds/day have been achieved, resulting in rapid clean-ups. In addition, the equipment can be installed and operated for clean-up without the interruption of business (e.g. in the case of service of service stations) or the disturbance of nearby communities.

HISTORY OF DEVELOPMENT

As an independent consultant, James J. Malot, the President of Terra Vac has managed many projects ranging from evaluation of industrial water supply to hazardous waste landfill design. He has extensive experience in all aspects of subsurface investigation including geology, hydrology, chemistry, engineering, and project management. Consulting eventually lead Mr. Malot to Puerto Rico five years ago on the largest Superfund investigation and clean-up project on the island.

At that site, conventional treatment techniques including biodegradation, excavation, and flushing were rejected on technical grounds. James J. Malot was instrumental in developing an innovative vacuum extraction process to decontaminate the soils in place. Since that time, Terra Vac has continued to develop and improve the process at more than forty other sites. In addition to the office in San Juan, Puerto Rico, Terra Vac has offices in Tampa, Florida, San Francisco, California and a newly opened office in Princeton, New Jersey.

EXPERIENCE OF PERSONNEL

The Terra Vac staff is lead by James J. Malot, P.E., a geological engineer with extensive academic and field experience in chemical engineering and hydrogeology. Michael D. Disabato, who manages the West Coast operation, is a chemical engineer with over thirteen years experience in the oil industry. Mr. Disabato's experience includes petroleum refinery engineering, refinery operations and environmental project management.

Terra Vac's staff has been growing steadily since its conception and currently includes hydrogeologists, chemical engineers, chemists, and trained vacuum recovery technicians.

Terra Vac personnel have substantial experience in the installation and operation of vacuum extraction processing systems for the clean-up of subsurface contamination. Our project managers coordinate field activities for investigation and clean-up projects as well as contribute to the evaluation of overall site conditions.

The hydrogeologist and geologist evaluate subsurface data for system design. Our chemists are experienced in the operation of laboratory and field gas chromatographs and the development of methodology to fit site conditions. Terra Vac's field technicians are trained in field sampling protocol, ground water monitoring techniques, and operation and monitoring of vacuum recovery systems.

PROPOSAL FOR THE VACUUM EXTRACTION OF VOLATILE ORGANIC
COMPOUNDS -- ERM-NORTH CENTRAL, INC
ECC SITE

PILOT TEST

Objectives:

1. Measure the radius of influence of vacuum extraction systems installed at the site to determine the optimum spacing of extraction points.
2. Quantify the rate of hydrocarbon extraction to enable projection of cleanup time.
3. Determine the impact of the shallow aquifer on vacuum extraction operations.
4. Determine vacuum level for optimum extraction efficiency.

Scope of Work

1. Installation of four vacuum extraction wells, including on-site analysis of soil samples taken during drilling. Well locations will be selected following a site visit and review of all existing soil sampling data.
2. Set-up of a mobile vacuum extraction unit, a piping manifold system and vapor/water separator. A source of 230/460 volt power within 75 feet of the unit will be required. If power is not available a portable generator can be used.
3. Vacuum extraction of volatile organic compounds and system monitoring, which includes the following:
 - a. Determine the radius of influence by extracting from each of the wells individually and measuring the effect at the other wells.
 - b. "Develop" the vacuum extraction wells by extracting vapors for 24 to 48 hours, depending on the vacuum levels observed in the other wells. As each extraction well is "developed", vapor samples from the well will be analyzed for hydrocarbons using on-site gas chromatography. This will provide data to assess the relative contribution of each extraction well system to the overall extraction process.

- c. Determine rates of hydrocarbon removal. This will be accomplished by connecting the vacuum units to all four wells and measuring the total mass of hydrocarbon removed per day.

All extracted hydrocarbons will be discharged from a dispersion stack. Based upon preliminary discussions with ERM, treatment of extracted vapors probably will not be required. If treatment is necessary, vapor phase activated carbon can be used.

5. Evaluation of data following the pilot test will be presented in a report indicating the radius of influence of the vacuum extraction process, relative extraction rates, overall quantity of contaminants recovered and projection of cleanup time.
6. The test is estimated to last three weeks.

Cost Estimate:

The cost of the pilot test is estimated to be \$80,000 and includes the following:

- a. System design. -- \$8,000
- b. Mobilization and set-up of vacuum extraction unit, and associated piping. Including sampling of soils during drilling with on-site analysis. -- \$24,600
- c. System start-up, stabilization, operation and monitoring, including on-site analytical work. -- \$41,400
- d. Evaluation and reporting of test results. -- \$6,000

The cost to provide power to the vacuum unit, and the cost of well installation are not included in the above estimate. For budgeting purposes a 15% contingency should be added to the above costs.

The cost for continued operation after the pilot test is estimated at \$5,000/week. This cost includes equipment use, maintenance, weekly monitoring and reporting.

TERRA VAC PROJECT LISTSUMMARY OF CLEAN-UP EXPERIENCE

<u>CLIENTS</u>	<u>LOCATIONS</u>	<u>CHEMICALS</u>	<u>CONDITIONS</u>
Industrial	Puerto Rico	Gasoline	<u>RECOVERY RATES</u>
EPA	Florida	PCE	Max 2500 #/day
Private	California	TCE	Avg 150 #/day
Public	New Jersey	Carbon Tet	<u>GEOLOGY/SOILS</u>
State Gov't	Michigan	BTX	Clay
Consultants	Pennsylvania	Diesel	Silt
Superfund	S. Carolina	Ethyl Acetate	Sand
	Louisiana	Methylene Chl.	Gravel
	Indiana	Chloroform	Fractured Rock
	Massachusetts	Chlorobenzene	Karst Limestone
	Wisconsin	Hexane	<u>GROUNDWATER</u>
	New Hampshire	Ethylbenzene	Min 2 ft. deep
		TCP	Max 300 ft. deep
		Cyclohexane	Dual extraction
		MEK	3-phase recovery
		Methanol	
		Acetone	
		Pyridine	
		DCE	
		TCA	
		DCB	
		Heavy Naphthas	